

REMARKS/ARGUMENTS

In the Office Action mailed November 12, 2009, claims 1-19 were rejected. In response, Applicant hereby requests reconsideration of the application in view of the proposed amendments and the below-provided remarks. No claims are added. Applicant submits that the proposed amendments place the present application in condition for allowance or in better condition for appeal.

For reference, a proposed amendment is presented for claim 1. In particular, the proposed amendment for claim 1 is presented to recite the limitations previously recited in claim 19. This proposed amendment is supported, for example, by the subject matter described in the specification at page 2, lines 17-32, of the present application. Consequently, claim 19 is canceled.

Claim Rejections under 35 U.S.C. 102 and 103

Claims 1-19 were rejected based on one or more cited references. The cited reference(s) relied on in these rejections include:

Look et al. (U.S. Pat. No. 6,393,714, hereinafter Look)

McMurtry (U.S. Pat. No. 4,153,998, hereinafter McMurtry)

In particular, claims 1-5 and 13-19 were rejected under 35 U.S.C. 102(b) as being anticipated by Look. Claims 6-12 were rejected under 35 U.S.C. 103(a) as being unpatentable over Look in view of McMurtry. However, Applicant respectfully submits that these claims are patentable over Look and McMurtry for the reasons provided below.

Independent Claim 1

Claim 1 is patentable over Look because Look does not disclose all of the limitations of the claim. Claim 1 recites:

A structure comprising:

at least one proportional variable resistor suitable for electrically measuring unidirectional misalignment of stitched masks in etched interconnect layers, said variable resistor comprising:

at least a first mask and a second mask that when superimposed comprise at least two test pads and two interconnects, wherein the two test pads are both formed by the first mask, wherein a resistance between the test pads is dependent on a distance along the interconnects between the test pads, and the resistance is indicative of the misalignment of the first and second masks.

(Emphasis added.)

For clarification, it should be noted that the test pads recited in the claim are “both formed on the same mask” and separated by “a distance along the interconnects between the test pads.” Thus, in order to disclose all of the limitations of the claim, Look would necessarily have to disclose test pads that satisfy both of these conditions.

However, Look does not describe test pads that satisfy both of these conditions. Although Look describes two sets of test terminals (150/155 and 160/165 of Fig. 1B), these test terminals of Look do not satisfy both of the conditions recited in the claim. In particular, the test terminals 150/155 are not separated by “a distance along the interconnects between the test pads,” even though the test terminals 150/155 appear to be on the same mask layer. Therefore, the description of the test terminals 150/155 does not disclose the limitation of “a resistance between the test pads is depending on a distance along the interconnects between the test pads.” Similarly, the test terminals 160/165 are not separated by “a distance along the interconnects between the test pads,” even though the test terminals 160/165 appear to be on the same mask layer. Therefore, the description of the test terminals 160/165 does not disclose the limitation of “a resistance between the test pads is dependent on a distance along the interconnects between the test pads.”

Furthermore, other possible combinations of test terminals as described in Look also fail to satisfy at least one of the conditions recited in the claim. The other possible combinations of test terminals are 150/160, 150/165, 155/160, and 155/165. Although each of these pairs potentially may be characterized as having a resistance between the test pads which is dependent on a distance along the interconnects between the test pads,

these pairs of test elements are not “both formed on the same mask.” Specifically, the test elements 150/155 must be formed on a separate mask from the test elements 160/165 (see the below discussion of the rejection of claim 17 for more information about the different masks). Therefore, the description of different pairs of test terminals that are separated by a distance along the interconnects between the test pads does not disclose the limitation of “both [test pads] formed on the same mask.”

For the reasons presented above, Look does not disclose all of the limitations of the claim because Look does not disclose test pads which satisfy both of the conditions recited in the claim. Even if the various pairs of test elements described in Look were to satisfy one of the two conditions recited in the claim, none of the pairs of test elements described in Look satisfies both of the indicated conditions. Accordingly, Applicant respectfully asserts claim 1 is patentable over Look because Look does not disclose all of the limitations of the claim.

Independent Claims 6 and 13

Applicant respectfully asserts independent claims 6 and 13 are patentable over the proposed combinations of cited references at least for similar reasons to those stated above in regard to the rejection of independent claim 1. Each of these claims recites subject matter which is similar to the subject matter of claim 1 discussed above. Although the language of these claims differs from the language of claim 1, and the scope of each claim should be interpreted independently of other claims, Applicant respectfully asserts that the remarks provided above in regard to the rejection of claim 1 also apply to the rejections of these claims.

Dependent Claims

Claims 2-5, 7-12, and 14-18 depend from and incorporate all of the limitations of the corresponding independent claims 1, 6, and 13. Applicant respectfully asserts claims 2-5, 7-12, and 14-18 are allowable based on allowable base claims. Additionally, each of claims 2-5, 7-12, and 14-18 may be allowable for further reasons, as described below.

In regard to claims 3 and 11, Applicant respectfully submits that claims 3 and 11 are also patentable over Look because Look does not disclose all of the limitations of the

claims. Claim 3 recites “the variable resistor comprises an inversely proportional variable resistor which exhibits a decreased resistance based on a greater distance between the test pads” (emphasis added). Claim 11 recites similar language. In contrast, Look merely describes a resistive element 115 with a resistance value that is inversely proportional to a contact area so that the resistance increases as the contact area decreases. Even though this description in Look references an inversely proportional relationship, the relationship described in Look relies on contact area rather than distance. Moreover, it appears from the arrangement in Look that an increased distance in the X direction would result in an increased resistance due to a decreased contact area. Thus, the arrangement in Look can be characterized by a proportional relationship (rather than an inversely proportional relationship) between distance and resistance. Therefore, the actual disclosure of Look does not support the assertions in the Office Action because Look does not disclose an inversely proportional variable resistor which exhibits a decreased resistance based on a greater distance between test pads.

In regard to claim 17, Applicant respectfully submits that claim 17 is patentable over Look because Look does not disclose all of the limitations of the claim. Claim 17 recites “the electrical contact is formed as part of the first and second masks on the same mask as at least one of the interconnects” (emphasis added). In contrast, the resistive element 115 of Look is not formed on the same mask as the conductive elements 105 and 110 that are described as interconnects by the Examiner. Although Fig. 1B of Look shows a sectional view of the resulting circuit arrangement and the insulator layer 120 which includes the resistive element 115 is in the same horizontal plane as the first conductive element 105, the resistive element 115 is not formed by the same mask or as part of the same mask layer as the first conductive element 105. In general, Look states that “the invention may be used to measure misalignment between a conductive layer and a contact layer.” Look, col. 1, lines 60-63. For reference relative to Fig. 1B, the conductive layer refers to the first conductive layer 105 and the contact layer refers to the insulating layer 120 and the resistive element 115. If the conductive layer and the contact layer were part of the same mask, then there would not be any misalignment between these layers, so it would not be necessary or useful to try to measure such misalignment, as suggested in Look. Moreover, from a practical standpoint, the insulating layer 120

must be formed separately from the first conductive layer 105 because each layer includes different materials, and each material is deposited in a separate layer. Specifically, the arrangement shown in Fig. 1B is likely formed using three or more masks (not counting additional masks used for etching) to form the first conductive element 105, the resistive element 115, and the second conductive layer 110. Although there may be other ways to make this arrangement, one example includes the following steps and masks:

1. Deposit mask of first conductive layer 105 on the oxide layer 125;
2. Deposit insulating layer 120 on first conductive layer 105 and oxide layer 125;
3. Etch insulating layer 120 to form contact window;
4. Deposit mask of resistive element 115 in contact window; and
5. Deposit mask of second conductive element 110 over insulating layer 120 and resistive element 115.

Thus, the use of these various masks and layers shows that that the resistive element 115 is not formed on the same mask layer as either of the conductive layers 105 and 110. Therefore, Look does not disclose forming the electrical contact on the same layers as the interconnects.

CONCLUSION

Applicant respectfully requests reconsideration of the claims in view of the proposed amendments and the remarks made herein. A notice of allowance is earnestly solicited.

At any time during the pendency of this application, please charge any fees required or credit any over payment to Deposit Account **50-4019** pursuant to 37 C.F.R. 1.25. Additionally, please charge any fees to Deposit Account **50-4019** under 37 C.F.R. 1.16, 1.17, 1.19, 1.20 and 1.21.

Respectfully submitted,

/Jeffrey T. Holman/

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Jeffrey T. Holman
Reg. No. 51,812

Wilson & Ham
PMB: 348
2530 Berryessa Road
San Jose, CA 95132
Phone: (925) 249-1300
Fax: (925) 249-0111